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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/044,438	01/11/2002	Slade H. Gardner	TA-00523	8581

7590 10/03/2005

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EXAMINER
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STAICOVICI, STEFAN

ART UNIT	PAPER NUMBER
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1732

DATE MAILED: 10/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/044,438

Applicant(s)

GARDNER, SLADE H.

Examiner

Stefan Staicovici

Art Unit

1732

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 22-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

***Response to Amendment***

1. Applicant's amendment filed July 13, 2005 has been entered. Claims 1-24 are pending in the instant application.

***Election/Restrictions***

2. This application contains claims 22-24 are drawn to an invention nonelected in the reply filed 8/02/2004. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

***Specification***

3. The preliminary amendment filed January 11, 2002 is objected under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material that is not supported by the original disclosure is as follows: the material of the vacuum bag is described in the original disclosure as "polyamide," whereas Applicant has amended "polyamide" to "polyimide" which is a totally different material.

Applicant is required to cancel the new matter in the reply to this Office Action.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-21 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claims 1 and 12, the limitation of “leaving no material in the mold other than the fibers” does not appear to have support in the original disclosure. Although the original disclosure has support for “leaving no ‘charred’ material or residue”, the original disclosure does not appear to have support for the broader limitation of “leaving *no material* in the mold other than the fibers” (emphasis added). Claims 2-11 and 13-21 are rejected as dependent claims.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1 and 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over De Jager (US Patent No. 5,439,627) in view of Wood *et al.* (US Patent No. 6,537,470 B1).

De Jager ('627) teaches the basic claimed process of forming a composite component including, providing a sheet of continuous longitudinal fibers, impregnating said sheet with a

temporary (fugitive) binder, pyrolyzing said binder by heating in an inert atmosphere to form a porous preform, placing said preform in a mold, infiltrating a resin into said porous preform and curing the resin to form said composite component (see Abstract; col. 5, line 55 through col. 6, line 3; col. 7, line 68; col. 8, lines 34-50 and col. 13, lines 8-61). Further, it is noted that De Jager ('627) teaches the use of a temporary (fugitive) binder that is removed without leaving any residue (see col. 6, lines 15-25) (leaving no material in the mold other than the fibers).

Regarding claims 1 and 11, although De Jager ('627) teaches vacuum infiltration of a porous preform, De Jager ('627) does not teach a resin transfer molding process. Wood *et al.* ('470 B1) teach a resin transfer molding process to infiltrate a carbon, fibrous porous preform including, placing said preform into a mold, injecting a molten resin or pitch into the mold, allowing the resin or pitch to cool below the melting point, and removing the impregnated preform from the mold (see col. 4, lines 33-38). Further, Wood *et al.* ('470) teach that the mold includes a top half, a bottom half opposed to the top half so that the top half and the bottom half form a mold cavity, at least one gate disposed in the top half or the bottom half, a valve that can admit resin into the gate and an arrangement for providing venting and/or vacuum to the mold (see col. 4, lines 38-45). Furthermore, Wood *et al.* ('470) teach heating of the porous preform prior or after being placed in the mold (see col. 4, lines 45-55). Therefore, it would have been obvious for one of ordinary skill in the art to have used the resin transfer molding process of Wood *et al.* ('470) to densify the carbon, fibrous porous preform of De Jager ('627) because, Wood *et al.* ('470) teach that resin transfer molding provides for an improved process by reducing cycle time (see col. 2, lines 1-15), hence providing for an improved product.

In regard to claims 6-8, De Jager ('627) teaches an olefine binder (thermoplastic) and a water-soluble bonder (methylcellulose) (see col. 6, lines 19-24).

Specifically regarding claims 9-10, De Jager ('627) teaches carbon fibers (see col. 5, line 20) and silicon carbide fibers (see col. 5, line 31).

8. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over De Jager (US Patent No. 5,439,627) in view of Wood *et al.* (US Patent No. 6,537,470 B1) and in further view of Hoge (US Patent No. 5,942,182).

De Jager ('627) in view of Wood *et al.* ('470) teach the basic claimed process as described above.

Regarding claim 2, although De Jager ('627) in view of Wood *et al.* ('470) teach a mold having an upper and a lower mold half for a resin transfer molding process, De Jager ('627) in view of Wood *et al.* ('470) do not teach that one mold half is a vacuum bag. However, the use of a vacuum bag as a mold half is well known as evidenced by Hoge ('182) who teaches that a vacuum assisted resin transfer molding process is equivalent to a resin transfer molding process to impregnate a fibrous preform (see col. 1, lines 13-54). Therefore, it would have been obvious for one of ordinary skill in the art to have used a vacuum bag as an equivalent alternative to a mold half as taught by Hoge ('182) in the process of De Jager ('627) in view of Wood *et al.* ('470) because, Hoge ('182) teaches that a vacuum assisted resin transfer molding process is equivalent to a resin transfer molding process when impregnating a fibrous preform and also to reduce costs by eliminating a mold half and an injection system.

9. Claims 3, 12 and 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over De Jager (US Patent No. 5,439,627) in view of Wood *et al.* (US Patent No. 6,537,470 B1) and in further view of Jones *et al.* (US Patent No. 5,023,041).

De Jager ('627) in view of Wood *et al.* ('470) teach the basic claimed process as described above.

Regarding claims 3 and 12, De Jager ('627) in view of Wood *et al.* ('470) do not teach flowing a gas into the mold cavity. It is noted that Wood *et al.* ('470) teach that the mold includes a top half, a bottom half opposed to the top half so that the top half and the bottom half form a mold cavity, at least one gate disposed in the top half or the bottom half, a valve that can admit resin into the gate and an arrangement for providing venting and/or vacuum to the mold (see col. 4, lines 38-45). Jones *et al.* ('041) teach a resin transfer molding process including, forcing a pressurized gas into the mold cavity (see Abstract). Therefore, it would have been obvious for one of ordinary skill in the art to have forced a pressurized gas into the mold cavity as taught by Jones *et al.* ('041) in the process of De Jager ('627) in view of Wood *et al.* ('470) because, Jones *et al.* ('041) specifically teaches that such a process reduces voids in the molded product, hence providing for an improved product.

In regard to claims 16-18, De Jager ('627) teaches a olefine binder (thermoplastic) and a water-soluble bonder (methylcellulose) (see col. 6, lines 19-24).

Specifically regarding claims 19-20, De Jager ('627) teaches carbon fibers (see col. 5, line 20) and silicon carbide fibers (see col. 5, line 31).

Regarding claim 21, De Jager ('627) teaches vacuum infiltration of resin (see col. 16, line 56), whereas Wood *et al.* ('470) teach providing a vacuum prior and during injection of the resin (see col. 10, lines 28-31). Hence, it is submitted that vacuum is provided during resin injection in the process of De Jager ('627) in view of Wood *et al.* ('470) and in further view of Jones *et al.* ('041).

10. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over De Jager (US Patent No. 5,439,627) in view of Wood *et al.* (US Patent No. 6,537,470 B1) and in further view of Jones *et al.* (US Patent No. 5,023,041) and Hoge (US Patent No. 5,942,182).

De Jager ('627) in view of Wood *et al.* ('470) and in further view of Jones *et al.* ('041) teach the basic claimed process as described above.

Regarding claim 13, although De Jager ('627) in view of Wood *et al.* ('470) and in further view of Jones *et al.* ('041) teach a mold having an upper and a lower mold half for a resin transfer molding process, De Jager ('627) in view of Wood *et al.* ('470) and in further view of Jones *et al.* ('041) do not teach that one mold half is a vacuum bag. However, the use of a vacuum bag as a mold half is well known as evidenced by Hoge ('182) who teaches that a vacuum assisted resin transfer molding process is equivalent to a resin transfer molding process to impregnate a fibrous preform (see col. 1, lines 13-54). Therefore, it would have been obvious for one of ordinary skill in the art to have used a vacuum bag as an equivalent alternative to a mold half as taught by Hoge ('182) in the process of De Jager ('627) in view of Wood *et al.* ('470) and in further view of Jones *et al.* ('041) because, Hoge ('182) teaches that a vacuum assisted resin transfer molding process is equivalent to a resin transfer molding process when



impregnating a fibrous preform and also to reduce costs by eliminating a mold half and an injection system.

***Allowable Subject Matter***

11. Claims 4-5 and 14-15 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 1st paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

12. Applicant's remarks filed March 24, 2005 and July 13, 2005 have been considered.

13. Applicants argue that "a person having ordinary skill in the art, when considering the word 'polyamide' in view of the entire specification, would most certainly understand that 'polyamide' is a typographical error and that 'polyimide' was intended in its place" (see page 7 of the amendment filed 7/13/2005). However, this is not found persuasive because when referring to the material "polyamide", Applicant is referring to a polyamide "vacuum bag" and, polyamide (nylon) vacuum bags are well known. It is noted that the specification does not lead one ordinarily skilled in the art to differentiate between a "polyamide" vacuum bag, as recited, and a "polyimide" vacuum bag, as Applicant states at this time.

14. In response to applicant's arguments against the teachings of De Jager ('627) and Wood *et al.* ('470) (see page 8 of the amendment filed 3/24/2005), one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references.

See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

15. Applicant argues that “nothing in the prior art suggests ‘leaving no material in the mold other than the fibers’” (see pages 9-10 of the amendment filed 3/24/2005). In response, it is noted that:

(a) Under MPEP §2111.03, the use of “[T]he transitional term ‘comprising’...is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. See, e.g., *Invitrogen Corp. v. Biocrest Mfg., L.P.*, 327 F.3d 1364, 1368, 66 USPQ2d 1631, 1634 (Fed. Cir. 2003). Hence, other materials in addition to fibers and binder are included in the reading of the claimed invention.

(b) The limitation of “leaving no material in the mold other than the fibers” is the end-effect of “heating the fibers to a temperature sufficient to pyrolyze the binder.” It is noted that under MPEP §2111, “the pending claims must be given their broadest reasonable interpretation consistent with the specification.” *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). Therefore, the broadest reasonable interpretation of the limitation is that due to the heat the binder is pyrolyzed and no residue binder material remains in the mold. As shown above, De Jager (‘627) teaches the use of a temporary (fugitive) binder that is removed without leaving any residue (see col. 6, lines 15-25) (leaving no material in the mold other than the fibers).

(c) The limitation of “leaving no material in the mold other than the fibers” does not appear to have support in the original disclosure. Although the original disclosure has support for

“leaving no ‘charred’ material or residue”, the original disclosure does not appear to have support for the broader limitation of “leaving *no material* in the mold other than the fibers” (emphasis added).

16. Applicant argues that “neither DeJager nor Wood *et al.* explicitly or implicitly suggest combining the references in the exact order in which claim 1 requires” (see page 10 of the amendment filed 3/24/2005). In response it is noted that De Jager (‘627) teaches a process of forming a composite component including, (a) providing a sheet of continuous longitudinal fibers, *then* (b) impregnating said sheet with a temporary (fugitive) binder, *then* (c) pyrolyzing said binder by heating in an inert atmosphere to form a porous preform, *then* (d) placing said preform in a mold, *then* (e) infiltrating a resin into said porous preform and *then* (f) curing the resin to form said composite component (see Abstract; col. 5, line 55 through col. 6, line 3; col. 7, line 68; col. 8, lines 34-50 and col. 13, lines 8-61). Wood *et al.* (‘470 B1) teach a resin transfer molding process to infiltrate a carbon, fibrous porous preform (see col. 4, lines 33-38). It is noted that the teachings of Wood *et al.* (‘470) are used to replace step (e) of De Jager (‘627), hence forming the process of De Jager (‘627) in view of Wood *et al.* (‘470) in which it would have been obvious for one of ordinary skill in the art to have used the resin transfer molding process of Wood *et al.* (‘470) to densify the carbon, fibrous porous preform of De Jager (‘627) because, Wood *et al.* (‘470) teach that resin transfer molding provides for an improved process by reducing cycle time (see col. 2, lines 1-15), hence providing for an improved product.

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

### ***Conclusion***

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stefan Staicovici, Ph.D. whose telephone number is (571) 272-1208. The examiner can normally be reached on Monday-Friday 9:30 AM to 6:00 PM.

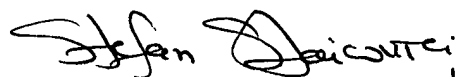
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael P. Colaianni, can be reached on (571) 272-1196. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

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may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Stefan Staicovici, PhD

  
Primary Examiner

9/29/05

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September 28, 2005